

Theory of the Metropolis

DONALD KUNZE
The Pennsylvania State University¹

Theory, especially architectural theory, should have some theory of the metropolis. This would not be the same as a theory about urbanism, or even urban origins, but a theory about what makes a metropolis a metropolis and not something else — an architectural rather than a historical or art-historical theory.

If by “theory” one means an idea or notion about something, this question is asked amidst the evident abundance of all kinds of theories. In most kinds of theory, the metropolis might be defined simply by comparing similar things or by distinguishing it from different things. Another approach would be to define the metropolis in terms of its functions, structure, or appearance. Disputes about whether a given place is or is not a metropolis are, in this sense, debates about shades of meaning and statistical cut-offs, not about essence.

There are other approaches to the metropolis that do not take this self-evident approach. Plato discussed the meaning of the *polis* in *The Republic*. His “conclusions” were ambiguous. No one could envision an ideal place that didn’t end in some agony of rational excess. In a more optimistic view, the Irish novelist James Joyce reconstructed a poetic metropolis within the ancient framework of the epic work, Homer’s *Odyssey*. Where Plato doubted that the imaginary could achieve reality, Joyce showed that reality depended on the imaginary for its very survival.

My approach proposes something untried: an analysis of the connections between (1) uses of space (and time) that have, historically, established metropolises and (2) the mental “tricks” required to produce the “metropolitan attitude”. I claim that both can be described as a topology that links outward complexity to “inner rules” that are consistent but multivalent. In brief, this topology is based on *negations* afforded by standard architectural elements such as vents and *poché* spaces; and on the *injunctive* and *poetic* use of such traditional devices as disappearance, invisibility, disguise, and doubling. Together, these negations or “dysfunctions” might be summarized in themes of *motility*, *scale*, and *semblance*.

Putting this in the terms of the philosophical and literary approaches mentioned above, I would combine Plato’s negations — “nots” — with Joyce’s “knots” of tangled paths and relationships. My topology, distilled from a notational calculus developed by the British mathematician, George Spencer-Brown, describes the “knots” tied in space and time which are also “nots,” or negations, that promote the evolution of the multiple and contradictory space we know as metropolitan.

THE THEME OF SOLITUDE

The metropolis I seek is based on a principle of “solitude”. Culture develops from a solitude of “cycloplan” societies, which shun contact, to a solitude defined by the cultural and psychological

separation of individuals and groups. Solitude at first ties groups together; later it solidifies the modern notion of the person. Solitude as a theme has extensive possibilities for three reasons: (1) solitude has to do with physical separation which is at the same time a mental separation; (2) separation is “displaced” into the commonplaces of human life, such as the need for defense and the ideas of independence, identity, and personality; and (3) solitude involves disguise, concealment, and recognition. The notation system I develop out of Spencer-Brown’s calculus plays out solitude as a strategy of bounded spaces (and times) that create complex, ambiguous conditions as well as multiple levels of signification.

THE INTRANSITIVITY OF SOLITUDE

Culture might be characterized as a “solitude machine” whose moving parts are essentially architectural. Through devices of motility, scale, and semblance, this machine manipulates such things as customs of commerce, spaces defined as sacred and secular, the role of strangers, and the notion of shelter. The only device of the machine is the boundary. The moving parts are citizens, divinities, elements, forces, ideas, and the like. These briefly take the form of spaces adjacent to other spaces. The same boundaries that permit them to change positions are often prominently embodied in architecture: walls, monuments, marks of property. Human boundaries facilitate both separation and connection, isolation and contamination. Like the Roman god Janus, they look both ways.

This Janusian quality is the mathematical property of “intransitivity.” Consciously, we conceive of space and time as consistent, extensive, and obedient to rational laws. However, our experience reports otherwise. Religiously, poetically, and personally, we encounter space and time in many non-rational forms. Even theoretical physics acknowledges this experience in its metaphor of “curved space.” Actually, the human condition is neither uniquely rational nor irrational but both. We represent life consciously and reliably in a transitive world but *experience* that same world as intransitive. To resolve the situation without destroying the duplicity required by human nature, thought and culture have invented the Janusian negational “nots” and topologically twisted “knots” that translate the language of one to the other. Intransitivity is both the *condition of irrational boundary behavior and the necessity* to combine both rational and irrational views. Through negation and twisting, nots and knots, solitude becomes the mark of the modern.

Representations of the architectural elements that effect these knots and nots — indeed, the objects themselves — do not reveal directly the fact that they are simultaneously continent and leaky. Some form of description is required that preserves this “invisible” property. George Spencer-Brown’s calculus appropriately uses only one symbol, a “cross” or “call,” and its operations are based on the

continence of the boundary and the depth of space created by concentrically contained spaces. There is, however, an ambiguity that I find in the calculus that is extremely important for those who study the human use of boundaries. It is impossible, I argue, to distinguish between the view that crossing and crossing back can be described by two spaces or three. This might be labeled the "you can't go home again thesis" or the "Heraclitan variation" ("You cannot step into the same river twice"). Clearly, boundaries do function in continent ways, but the addition of time means that the places to which we return are in some ways different from the ones we left.

One of Spencer-Brown's most useful expressions is the "echelon" a concentric set of "spaces" that can also be considered as successive events. The structure of perceptual foreground, mid-ground, and background as well as the linear conception of time are prominent and obvious examples of echelon structure. Spencer-Brown shows that the echelon can be transformed into an alternative expression.

It is interesting to compare this alternative form with the type of "visual rotation" used by Dürer in his famous illustration "The Artist and Model in the Studio." Here, the viewer interrupts a process normally viewed front-to-back and translates it as a left-to-right exposition. Similarly, Spencer-Brown's transformed expression "rotates" the transitive logic of the echelon into the intransitive expression where the final element, C, is able to appear in two places at once. A key to this transformation is the insertion of a double boundary (equivalent to zero in numerical systems). This "deepens" the space so that C can be redistributed across the same depth level into two separate spaces.

I have converted Spencer-Brown's notation into an expression that symbolizes the steps of the echelon's transformation. Initially, some "conventional" or "traditional" order is shuffled (ACB becomes ABC). Spencer-Brown's double bound creates a "pocket" space (A B[] C), and the third element, C, splits to join both A and B-cross: [AC] [B]C].

The situation can be drawn as a triangle which emphasizes the echelon as a transitive expression and the "deepening" of B, the middle element, as the means of including intransitivity.

Why use an unfamiliar calculus to address the issue of metropolitan solitude? Key myths and traditions emphasize repeated themes and elements, such as victims, authorities, and rituals that shift the dominance and position of elements. The calculus enables comparison of these examples in a consistent way so that description is not limited by context. A myth about the foundation of Rome, for example, can be compared to the predicament of Odysseus in the labyrinth of the Cyclops. Essentially a "formula for solitude," the echelon and its transformation shows how radically superficial perception and representations may differ from the "inner logic" of the new order.

METROPOLITAN ORIGINS

The theme of solitude requires some explaining. There is a unique theory of urban origins developed by the geographer, Paul Wheatley. Wheatley did not consider size, density, or functional diversification as causes of the "urban." Rather, he held that a true city is a bridge between an ancient and modern way of living, facilitating a transformation of society but also preserving the seeds of that transformation. Wheatley studied many early centers of urbanism and found a set of striking common features. All had begun in conjunction with places of ritualized burial. Burial had not been simply something that had to be done because people living in a city died. Ritual sites preceded the formation of a real city. Cities of the living were built on top of the cities of the dead.

Silent Trade

Fustel de Coulanges, Giambattista Vico, and others have noted

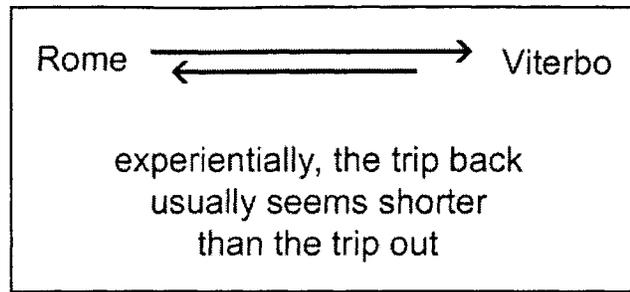


Fig. 1. The ambiguity between the trip out and the trip back.

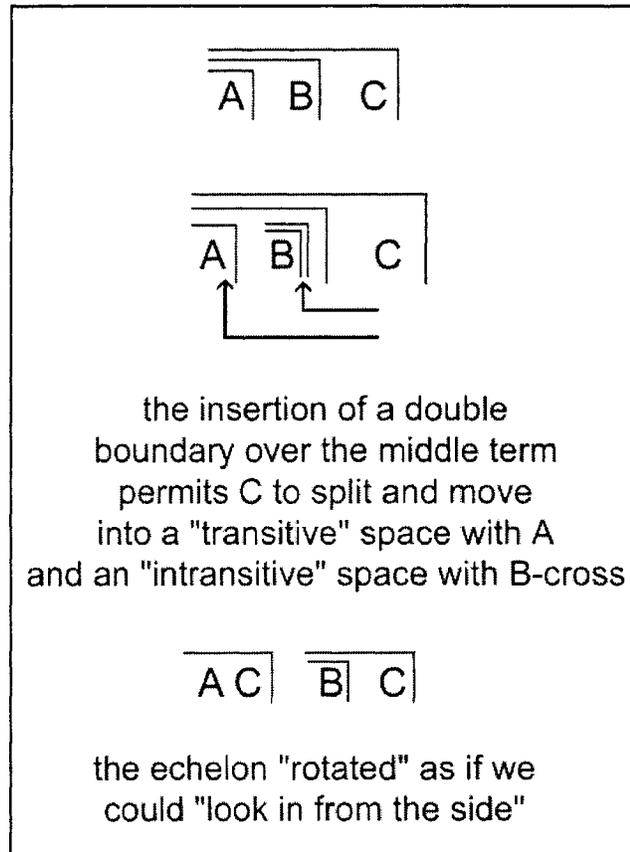


Fig. 2. The "rotation" of the echelon expression.

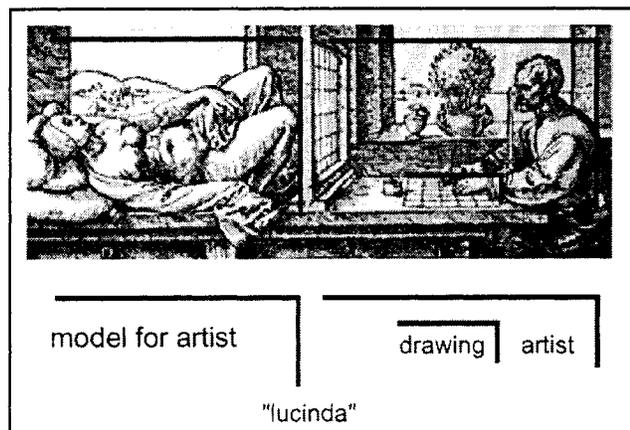


Fig. 3. Dürer's "Artist and Model in the Studio" as a "rotated expression."

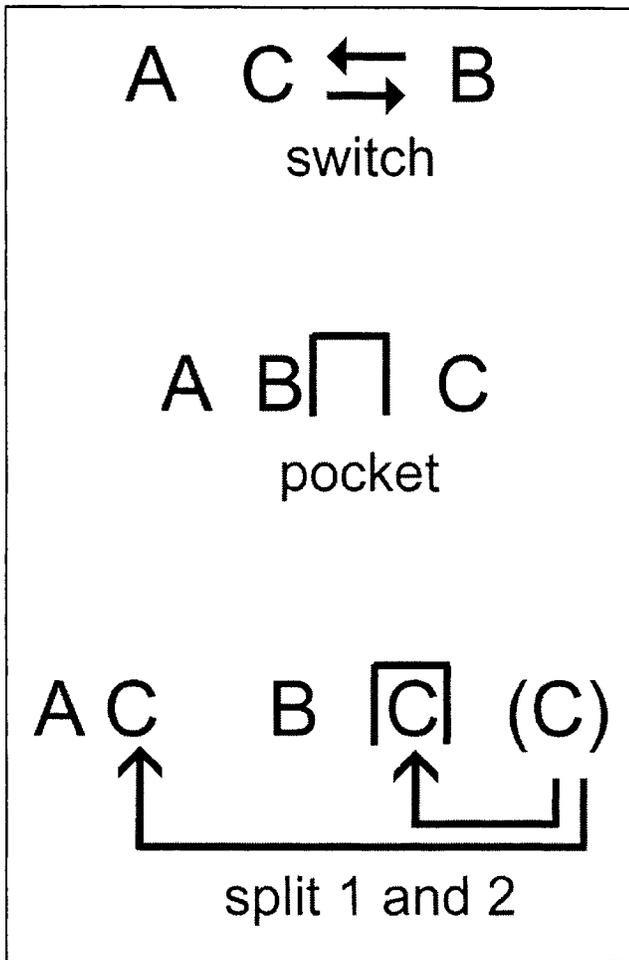


Fig. 4. Conversion of Spencer-Brown's echelon notation into "stages" of the "rotation" transformation.

that ancient societies were "cyclopiant" — contact between strangers was forbidden. Each family tended its own household gods and the notion of a nation was unknown. Nonetheless, tribes living close to each other were able to exploit environments in specialized ways and trade the fruits of their labors with other groups without ever coming into direct contact. The institution that enabled this "silent trade" is the secret behind the evolution of the city.

At common points of contact — usually crossroads of shared paths — one group deposited surplus goods. Another group replaced these with their own surplus goods, which the first group retrieved. Without ever seeing each other, this institution acquired stable exchange rates with seasonal adjustments. The fact that silent trade is still in practice in some parts of the world suggests that it is one of culture's most enduring and reliable creations.

One feature of silent trade was crucial to the development of the metropolis. Each group conceived that the other group was divine. Each thought that the goods they brought for trade were not simply exchanged but were actually transformed and that the source of this transformation was the Underworld itself, filled with wondrous riches.

Hermes

Silent trade required no middlemen. Participants were rural; even nomads could practice it. Norman O. Brown has traced the evolution of the god Hermes as the figure associated first with silent trade and, later, with thievery and communication. One interesting part-time occupation of Hermes was, however, his role as the conductor of souls of the dead to the underworld. This complex of roles and

personalities echoes my thesis about urban origins.

Hermes was, as his name implies in Greek, at first just a pile of stones where silent trade occurred. Along a path, someone might throw a stone to hit another stone. Someone else would add a stone, until the pile became identifiable as such. The size of the pile became a histogram of the business potential of that spot on the road, and the herm became both a marker and an altar to the god of commerce (hence, the Latin name for Hermes, "Mercury" and its derivatives, "market" and "merchant").

As groups intensified their redistribution of surplus, they were able to diversify. One group, however, was able to gain precedence. As in the case of Rome, space shared between non-communicating tribes was used as a common burial site. A group, or rather "non-group," began to specialize in burial of and communication with the dead. They facilitated the religious transformation from familial worship of household gods to the collective worship of the generic ancestral dead. Because these proto-funeral directors were by extension adept at handling language translation, augury, and general religious matters, they benefited from the increasing commerce among the scattered groups and, with confederation, were the natural choice as priest-kings. In charge of auspices, sacrifice, and all things linguistic, political, and religious, they were able literally to speak with authority.

However, for a metropolis to occur, something else had to happen. Where it happened is also interesting — inside the human mind. It was a conceptual twist that permitted a form of thought as yet unimagined. This twist is central point of the metropolis.

Silent Trade as a Topological Twist

To think of silent trade in terms of a topological bridge between a cyclopiant (transitive) and hermetic (intransitive) way of thinking, it's necessary to see the custom in terms that will link it to subsequent cultural formations. The practice of silent trade requires three kinds of dysfunction, or failure — three "knots" that permit the tying of the other kind of "knot." **Motility dysfunction:** The trading place occurs at a "defect" (from the cyclopiant point of view at least) in a road: a point of crossing where one might encounter strangers. Crossroads were still a danger in the time of Classical Greece; Œdipus meets and murders his true father at a crossroads. **Scale dysfunction:** The defect of scale is accomplished by the magical function of the "vent" through which left goods disappear and transformed gifts re-appear. Prominent vents in the latter-day practice of silent trade include the extremely scale-dysfunctional chimneys through which Santa Claus descends to exchange miraculous presents for milk and cookies. The impossibility of the rotund saint fitting through the chimney vent seems to be an essential part of the story. **Semblance dysfunction:** semblance dysfunction makes silent trade work. Human trading partners are mistaken for gods, although their only disguise is their absence and invisibility. The herm, or point of exchange, is taken to be an altar to a god.

The three dysfunctions of motility, scale, and semblance are sufficient to transform a "natural" (transitive/cyclopiant) order of gods, tribes, and stones into a dysfunctional and intransitive order of tribes separated from the gods by stones. The stones mark the presence and potential of the gods and, ultimately, are displaced into other uses requiring the authority of the gods.

Both transitivity and intransitivity are required for silent trade to work. Physical exchange of surplus goods is "maintained" by the idea that the goods disappear to the underworld where they are magically transformed and returned in accordance with true market value. This contradictory condition defines a "triangle" rather than a back-and-forth between two points (trading partners).

The new notational form uses Spencer-Brown's "echelon expression" in two ways. First, it shows how a sequence of phenomena may be rearranged through the insertion of a double bound (double negation) over the middle element. The mathematical reasons for this are complemented by examples from myth, art, and architecture

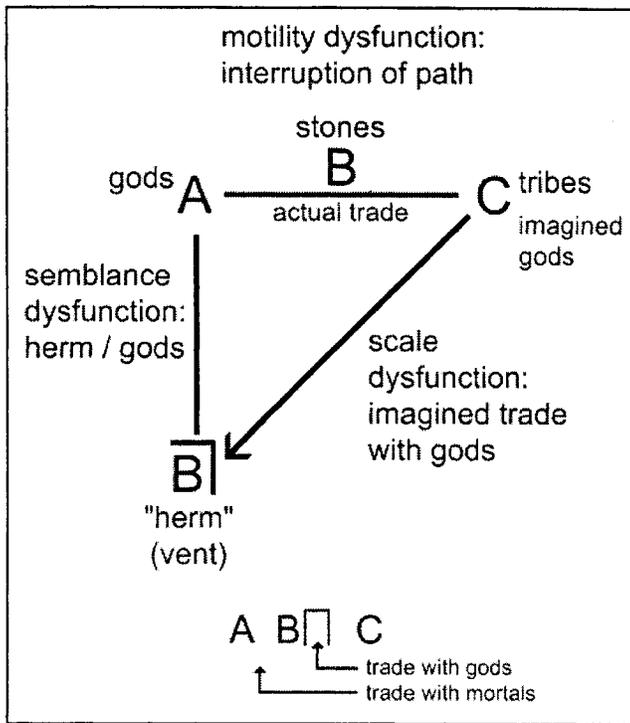


Fig. 5. The "triangle" of silent trade.

that focus on the ambiguous status of the middle element. (Compare, for example, the role of the camera in Hitchcock's *Rear Window* with the mirror in Velázquez's "Las Meninas.") Second, the triangle shows how the shuffling of the ABC sequence enables C's doubling and relocation. It's as if going from one point to another and back again has returned us to a point that is both identical and different from the origin.

These diagrams can be applied to a broad range of examples where transitivity gives way to intransitivity. It's worth pointing out that the 'A' position is frequently occupied by an authority figure, that 'C' is often a victim or dupe, and that 'B' is characteristically a motive, force, or sometimes-violent action. In this case, the upper chord is a transitive, "cycloplan" condition that forbids contact with strangers. The "not-B," symbolized by a cross over the letter stands for the herm transformed, a channel to Hades.

Motility is disrupted by the pile of stones that delays the traveler for the purpose of trade or religious observance. Scale is disrupted when the goods left at the scene disappear into hyperspace. Semblance is confounded when the recipient of these goods mistakes the source as gods rather than men. Without these defects of motility, scale, and semblance, silent trade could not persist as it has done for over thousands of years.

Romulus and Remus

The "twist" of silent trade which converts defect to effect is linked to the traditions about the foundation of cities. Using the themes of motility, scale, and semblance, we can expand the triangular notion of intransitivity to include explicit use of vents and other "spaces of concealment" that transform cycloplan to secular life.

The case of Rome: Rhea Silva gives birth to twins fathered by Mars. Amulius, usurper of the Alban throne, fears a prophecy that the twins will one day rule and throws them into the Tiber. The twins are saved by a she-wolf and raised by a shepherd. The twins take revenge on Amulius and found a new city on the site of their attempted murder. On the Capitoline, Romulus plows a furrow. He lifts the plow at points to permit entry. This ritual "reinstates" the *manes*, or ancestral spirits, present in soil taken from the old city into

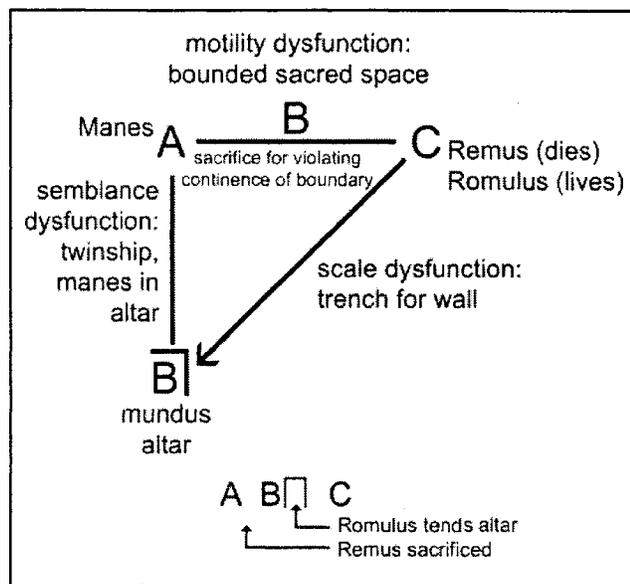


Fig. 6. The boundary logic of the foundation of Rome.

the *mundus*, or "mouth" of the altar at the center of town. The acts of circumscribing the space *twice* — once from the exterior and again from the interior — allows both for a communication with the manes and a protection of secular life from their potential interference. Remus mocks this ancestral installation by jumping over the furrow. The attendants murder him for this sacrilege. This ritual death constitutes the *first crime* of the city and has the psychological status of a secret concealed within the walls which both protects and preserves the city as long as the *crime* retains its criminal (= "sacred") value.

The key to the diagram lies in the rearrangement of the "natural" order of gods, twins, and soil (*manes*). The repositioning (putting the *manes* in the middle) affords the brothers a final position where, by the laws of Spencer-Brown's calculus, they are able to double and distribute to adjacent regions. The myth anticipates this by making the brothers twins, one and two at the same time.

The manes are relocated as the authority of the new city by digging two furrows: a double bound that echoes another element of Spencer-Brown's boundary calculus. The space between the bounds tricks the *manes*, permitting the founders to establish secular space between the outer wall and inner *mundus*. Motility is dysfunctional in Remus's violation, Romulus is "scaled" in his association as the priest of the central altar while Remus, the substitute, returns to the gods. The semblance dysfunction echoes in the mythologically prominent theme of twins (cf. Castor and Pollux).

The Curtius Myth

To corroborate the boundary status of the Romulus-Remus story, I will compare another story of Roman origins. In this alternative myth, the earth of Rome's forum liquefies, making building impossible and walking dangerous. A soothsayer is consulted. His pronouncement is: Rome can be saved only by sacrificing *that which is most valuable* to her. No one in the assembly knows exactly what this might be, but presently a royal citizen, Curtius, announces that Rome's most valuable possession is a citizen willing to die for his city. Thereupon, he mounts his horse and rides, fully armed, into the mire. The ground immediately hardens and normal civic activity resumes. The artifact resulting from Curtius's sacrifice is visible today as a series of concentrically arranged stones known as the "Curtian Lake" (*Lacus Curtius*). A small plaque shows an armed horseman descending into the underworld.

In combination with evidence of silent trade and the Romulus-

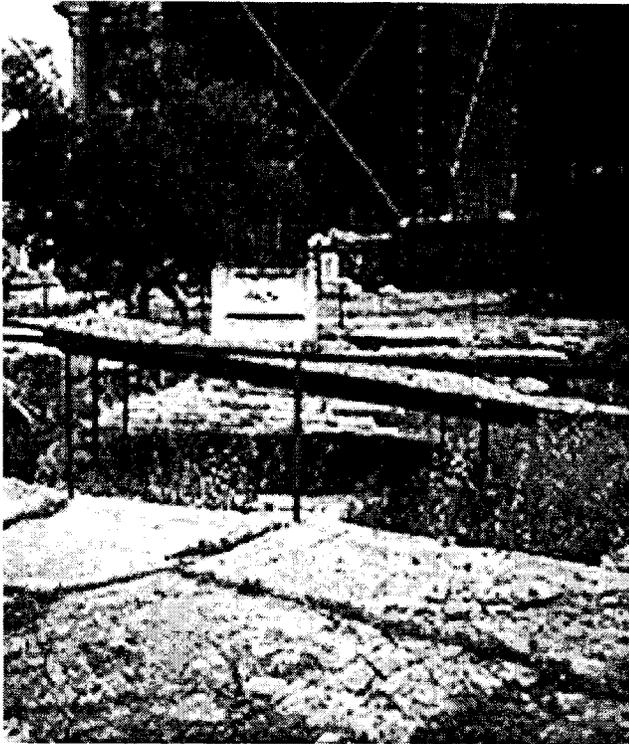


Fig. 7. The "Curtian Lake" in the Forum Romanum.

Remus story, we can figure out the connections. Originally, Rome was an agglomeration of seven tribes occupying seven adjacent hills. The practice of silent trade had evolved into the common use and diversification of the land between the hills. The site of the future *Forum Romanum* was a burial site administered by an eighth group, which quickly consolidated their power as middlemen and administrators by controlling the authority of the manes. In order to consolidate their power, however, it was necessary to convert the marshy burial ground into the center of a single urban entity. This required a re-definition of the ground as "consecrated" rather than cursed by death. The generic dead had to be re-packaged as a single individual.

It is easier to honor the death of a single hero than to placate the multitude of angry souls. The Romans seem to have concluded that a story about that hero was in order. Although it may be difficult to see at first, the Curtius story is identical to the account of Romulus's fratricide. The facts are these: In both stories we have a person whose death secures civic value. In both stories we have a direct representation of the underworld, the furrow in the Romulus tale, the liquefied ground in the case of Curtius. Both suggest the vengeance of the dead. Finally, the accomplishment and the means to that accomplishment in both stories are identical: death — or, more accurately, collective, ritualized murder — founds a city.

Transitivity and Intransitivity

If the echelon expression is a literal representation of temporality as "one thing follows another," it is because it is also a portrait of our human desire to define space and time in transitive, metrical ways although our experience of them is rarely so objectifiable. We imagine that we establish physical and mental boundaries that are "perfectly continent" — crossing from one space to another and then

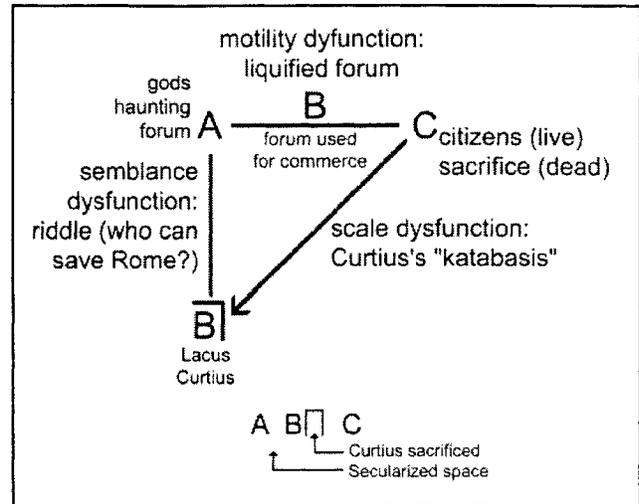


Fig. 8. The boundary logic of Curtius's self-sacrifice.

back again *should* return us to our original position. Yet, we know that because of the influence of time and memory, we can not return *precisely* to the "same" spot. The boundary, which logic requires to be continent, seems to leak. We are forever finding, as Dorothy in *The Wizard of Oz*, an empty house capable of taking us to a remote emerald city by means of a vent through reality.

My thesis focuses on particular uses of the intransitivity of boundaries. It suggests that the human ambiguity towards boundaries is structured, and that this structure is used to create human institutions. Because this structure has an economic vocabulary and a consistent logic, we can study related human events — such as the foundation of cities and the birth of the idea of the metropolis — and discover finite means to infinite ends.

In using the transformation of the echelon expression to "parse" the common logic of silent trade, the murder of Remus, the self-sacrifice of Curtius, and ultimately the metropolis itself, we also can see that essence of history (as odd as it sounds) might well be mathematical. Even more odd, this mathematics may well turn out to be not the geometry of Euclid but, rather, a non-numerical, mental calculus of knots and knots that permits one act, one sign, or one thought to have myriad effects and polysemous implications.

REFERENCES

- Brown, Norman O. *Hermes the Thief: The Evolution of a Myth*. Madison: University of Wisconsin Press, 1947.
- Fustel de Coulanges, Numa Denis. *The Ancient City: A Study on the Religion, Laws, and Institutions of Greece and Rome*. Baltimore: The Johns Hopkins University Press, 1980.
- Rykwert, Joseph. *The Idea of a Town: The Anthropology of Urban Form in Rome, Italy and the Ancient World*. Cambridge, Mass.: MIT Press, 1988.
- Spencer-Brown, George. *Laws of Form*. New York: E. P. Dutton, 1979.
- Wheatley, Paul. *The Pivot of the Four Quarters: A Preliminary Enquiry into the Origins and Character of the Ancient Chinese City*. Chicago: Aldine Publishing Company, 1971.
- Vico, Giambattista. *The New Science of Giambattista Vico*. Translated by Thomas Goddard Bergin and Max Harold Fisch. Ithaca: Cornell University Press, 1968.